SUPPORT FOR THE AMENDMENT

This Amendment amends Claim 20; and adds new Claim 40. Support for the amendments is found in the specification and claims as originally filed. In particular, support for Claim 20 is found in Claim 20 and in the specification at least at page 7, lines 13-15. Support for new Claim 40 is found in the specification at least at page 6, lines 28-29 ("amorphous-crystalline phase change and vice versa"); page 8, lines 21- 23 ("to further improve the stabilization and the delimitation of the melted area, the active central area may be at least partially confined laterally by ..."); page 9, lines 23-24 ("active central area which is more meltable than the passive outmost areas"); and in Fig. 1B No new matter would be introduced by entry of these amendments.

Upon entry of these amendments, Claims 20-27 and 29-40 will be pending in this application. Claims 20 and 34 are independent. Claims 26-27, 30 and 34-38 are withdrawn from consideration pursuant to a Restriction/Election of Species Requirement.

REQUEST FOR RECONSIDERATION

Applicants respectfully request entry of the foregoing and reexamination and reconsideration of the application, as amended, in light of the remarks that follow.

The present invention relates to a phase-change memory cell capable of undergoing a large number of write cycles. The phase-change memory cell includes an active central area located between two passive outmost layers, and an interface between the active central area and each passive outmost area. Each passive outmost area is made in a material having a melting temperature higher than that of the material of the active central area. In addition, the interface is inert or quasi-inert, even during a write operation, so that the amount of melted material in the active central region during a write operation is delimited and stabilized. Specification at page 1, lines 5-7; page 6, line 25 to page 7, line 5; page 7, lines 13-15.

Claims 20-24, 29, 31-33 and 39 are rejected under 35 U.S.C. 103(a) over U.S. Patent No. 4,177,475 ("Holmberg") in view of U.S. Patent No. 4,314,256 ("Petrov"). Claim 25 is rejected under 35 U.S.C. 103(a) over Holmberg and Petrov and further in view of U.S. Patent Application Publication No. US 2004/0051161 A1 ("Tanaka").

Holmberg discloses an amorphous memory device for an electrically alterable read-only memory. Holmberg at abstract. The memory device is formed of a graded structure having at least three regions or layers of amorphous material selected from the tellurium based chalcogenide class of materials, particularly tellurium-germanium systems. Holmberg at abstract. Holmberg discloses a layer 30 of a germanium-tellurium composition containing 0 to 10% germanium formed on a layer 29 of a germanium-tellurium composition containing 10 to 25% germanium deposited on a layer 28 of a germanium-tellurium composition containing 25 to 45% germanium. Holmberg at column 5, lines 21-31. The layer 28 is on a negative conductor 24, and a conductor 23 is on the layer 30. Holmberg at column 5, lines 15 and 34; Fig. 3.

However, Holmberg is silent about separating one germanium-tellurium layer from another with a separation layer. The Office Action at page 3, lines 16-18 admits that Holmberg does not disclose "an interface, inert or quasi-inert from a physico-chemical point of view, between the active central area and each passive outmost area".

Petrov discloses a method for recording information on a radiation-sensitive material. Petrov at title. Petrov discloses a metallic layer 1 on a separation layer 2 on an inorganic material layer 3. Petrov at column 4, lines 25-27; Fig. 4. Petrov discloses that the separation layer has a thickness sufficient for preventing the metallic layer from interacting with the inorganic material layer when exposed to radiation having an energy density lower than a threshold value required for a local breakdown of the separation layer. Petrov at column 2, line 68 to column 3, lines 6.

However, Petrov discloses that during recording a local destruction of the separation layer 2 occurs as a result of an electric breakdown. Petrov at column 4, lines 51-53. Breakdown of the separation layer 2 creates conditions for interaction between the metallic layer 3 and the inorganic material layer 1, resulting in the formation of an interaction product 5 between said layers, the interaction product having physical and chemical properties different from those of the metallic layer and of the inorganic material layer, which causes the reflection factor of the exposed area of the material to change. Petrov at column 4, l, lines 54-62; FIG. 4.

Because Petrov's separation layer 2 is destroyed during writing, Petrov teaches away from a separation layer 2 that is inert or quasi-inert during writing.

The cited prior art fails to suggest a separation layer that is not destroyed during writing. Thus, Holmberg in view of Petrov fails to suggest the independent Claim 20 limitation of "the interface being inert or quasi-inert from a physico-chemical point of view even during a writing operation of the phase-change memory cell".

Tanaka fails to remedy the deficiencies of Holmberg in view of Petrov. The Office Action at page 6, lines 14-17 cites Tanaka against Claim 25 for suggesting that the material of the active central area includes between about 16% and 30% of tellurium and between about 84% and 70% of antimony.

Because the cited prior art fails to suggest the independent Claim 20 limitation of "the interface being inert or quasi-inert from a physico-chemical point of view even during a writing operation of the phase-change memory cell", the prior art rejections should be withdrawn.

New Claim 40 is further patentably distinguishable over the cited prior art. As discussed above, Holmberg discloses a memory device formed of a structure having at least three regions or layers of amorphous material selected from the tellurium based chalcogenide

class of materials. Petrov discloses a separation layer 2 between a metallic layer 3 and a inorganic material layer 1, neither of which has undergone a phase change; and that the separation layer 2 is destroyed when a phase change occurs during writing. However, the cited prior art fails to suggest a separation layer (interface) directly between a passive outermost area and an active central area, where the active central area has undergone a phase change (e.g., during writing). Thus, the cited prior art fails to suggest the Claim 40 limitations that "each interface is directly between the active central area and one of the two passive outmost areas; and the material of the active central area has undergone a phase change". During writing the interfaces serve to confine and delimit the active central area when the active central area undergoes a phase change (e.g., melting). Thus, the interfaces provide the phase-change memory cell of the present invention with improved stability and cyclability.

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Applicants respectfully request favorable consideration and prompt allowance of the application.

Should the Examiner believe that anything further is necessary in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

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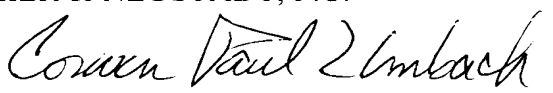

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